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REVIEWS OF RECENT LITERATURE.

GENERAL BIOLOGY.

The Rôle of Water in Growth.[1] — Dr. C. B. Davenport has made an interesting series of experiments upon the eggs and embryos of Amblystoma, toads, and frogs to determine the proportions of water relative to the other constituents of the body during the earlier stages of growth. Defining growth as "increase in volume," he finds that "exactly as in plants, there is a period of slow growth accompanied by abundant cell division — the earliest stages of the egg. There follows, after the first few hours, a period of rapid growth due almost exclusively to imbibed water, during which the percentage of water rises from 56 to 96; lastly comes the period of histological differentiation and deposition of formed substance, during which the amount of dry substance increases enormously, so that the percentage of water falls to 88 and below. But the *growth* is due chiefly to imbibed water."

Assuming for the sake of argument "that the dry substance is all growable," the author finds that the curve of daily percentage increments based on dry weights of tadpoles fails to confirm Minot's generalization that there is a "certain impulse given at the time of impregnation which gradually fades out, so that from the beginning of the new growth there occurs a diminution in the rate of growth." On the contrary, he finds in tadpoles no loss in the rate of growth of the growing substance. He points out further that no such diminution is noticeable in plants.

There are one or two points in which we would take issue with the author. In the first place, the use of the term "plasma," borrowed from the German, in place of "spongioplasm" or "reticulum" seems to us an unfortunate one. The common use of this term is to designate the fluid portion of the blood, and, therefore, when it is used in a description of the living cell-contents it conveys a false impression to English readers. In the second place, it does not seem to us to follow, because growth as a whole is shown to be due to the imbibition of water, that "we have to conclude, therefore, that all local growths are due to local imbibition of water." It is well known that in tadpoles, especially, nearly all the cells are heavily laden with yolk granules until a relatively late period of development. Of this the author takes no account. It is quite conceivable that local growth might take place without any general or local increase in the percentage of water. Until the larva is able to take food the increase in the dry weight of the living material is due to assimilation of yolk, and it may be that local growth during this period is due solely to the solution, transference, and assimilation of this food supply stored within the organism. If it can be shown that there is an increase in the percentage of water in a local growth, such, for example, as a gill-bar, it may well be that it is a purely secondary phenomenon. Then the question, What determines excessive local growths? would not resolve itself into, What determines excessive local imbibition of water? but into, What determines excessive transference and assimilation of yolk material? In supposing that local growth is due primarily to the absorption of water, whether active or passive, we are assuming a simplicity of operation that is hardly warranted by the known complexity of living material.

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[1] C. B. Davenport. *Proc. Boston Soc. Nat. Hist.*, vol. xxviii, no. 3, pp. 73–84. June, 1897.

The paper is well illustrated by tables and plotted curves.

The Capacity for Regulation in the Development of Organisms. — The word "regulation," as employed by Driesch, expresses the capacity of an organism to obliterate in development the effects of any malforming influence to which it has been subjected, so that, despite the mutilation, it develops into the normal form. Driesch's former studies had been chiefly made upon developing eggs; he now (*Arch. f. Entwicklungsmech.* Bd. v, Heft 3, 1897) examines some cases of regeneration.

As is known from the studies of Miss Bickford, regenerating stems of Tubularia do not form new tentacles by a sprouting out at the cut edge, but by a metamorphosis of the old tissue of the stem just below the cut. The old tissue thickens along a number of longitudinally lying areas representing the future tentacles, which soon become fully formed. This phenomenon of differentiation in place is called by Driesch reparation. The first question Driesch asks is: If the repairing stem be split lengthwise so that a double head is formed, will the normal number of tentacles be repaired through regulation on each half head? The result showed that nearly or quite the normal number is so formed.

Again, if the head is cut off and regenerated, and then cut off a second time, will the time elapsing before complete reformation be